

CASE REPORT

Exercise-Induced Atrioventricular Block

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ABSTRACT

Complete atrioventricular (AV) block associated with exertion is rare. We describe the case of a 67-year-old woman with normal conduction at rest, who developed AV block during a treadmill test. She gave a history of dizziness during exercise. She had no medical history. The patient's physical examination was normal. Electrocardiography (ECG) showed normal sinus rhythm, incomplete right bundle branch block and a first-degree atrioventricular block. During treadmill test, ECG showed complete AV block. Electrophysiological study demonstrated rate dependent nodal AV block. Permanent dual chamber pace-maker was implanted to the patient. There is no any symptom after pace-maker.

Key words: Atrioventricular block, Treadmill test, Coronary artery disease.

Egzersizle Bağlı Atrioventriküler Tam Blok

ÖZET

Egzersiz ile ilişkili atriyoventriküler (AV) blok nadir görülür. Koşu bandı testi sırasında AV blok gelişen, istirahatte normal iletimi olan 67 yaşında bir olgu sunduk. Egzersiz sırasında baş dönmesi şikâyeti ile gelen hastanın özgeçmişinde özellik yoktu, fiziksel muayenesi normaldi. Elektrokardiyografide (EKG), sinüs ritmi ile inkomplet sağ dal bloğu ve birinci derece AV blok vardı. Koşu bandında yürüme sırasında tam AV blok gelişti. Elektrofizyolojik çalışmada hıza bağlı nodal AV blok izlendi. Hastaya kalıcı çift odacıklı kalp pili implantasyonu planlandı. Kalp pili sonrası takiplerde hastada semptom izlenmedi.

Anahtar kelimeler: Atriyoventriküler blok, efor testi, koroner arter hastalığı

INTRODUCTION

Complete atrioventricular (AV) block associated with exertion is rare. It is mostly originated from infranodal area of AV node. Intranodal AV block is rare and underlying etiologies are usually coronary ischemia or spasm. However, relatively constant and effective refractory period of the his-purkinje system may cause of AV block in patients without coronary ischemia. We present in this case report a patient with complete AV block triggered by exercise.

CASE REPORT

A 67-years-old woman complained of a dizziness during exercise for 3 months. There was any feature in her medical history. The patient's physical examination was normal. Blood pressure was 130/70 mmHg. Echocardiographic findings were within normal limits. Chest radiography was normal. Electrocardiography (ECG) showed a normal sinus rhythm with incomplete right bundle branch block and a first degree atrioventricular block. (Figure1). A treadmill exercise test with Bruce protocol was performed to the patient because of detection of coronary ischemia. Complete AV block was occurred in ECG during second stage of the protocol (Figure 2). There was no ischemic change in the ECG during the exercise test. Coronary angiography was performed for determinate to coronary artery disease and was found normal coronary arteries. Laboratory analysis showed that a serum creatinine level of 0,8 mg/dl, potassium level of 4,57 mmol/l, thyroid stimulant hormone level of 2,1 mU/ml. Electrophysiological study (EPS) showed rate-dependent nodal AV block. (Figure 3). EPS revealed that the right atrial-His bundle deflection (AH) interval was 80 ms and the His

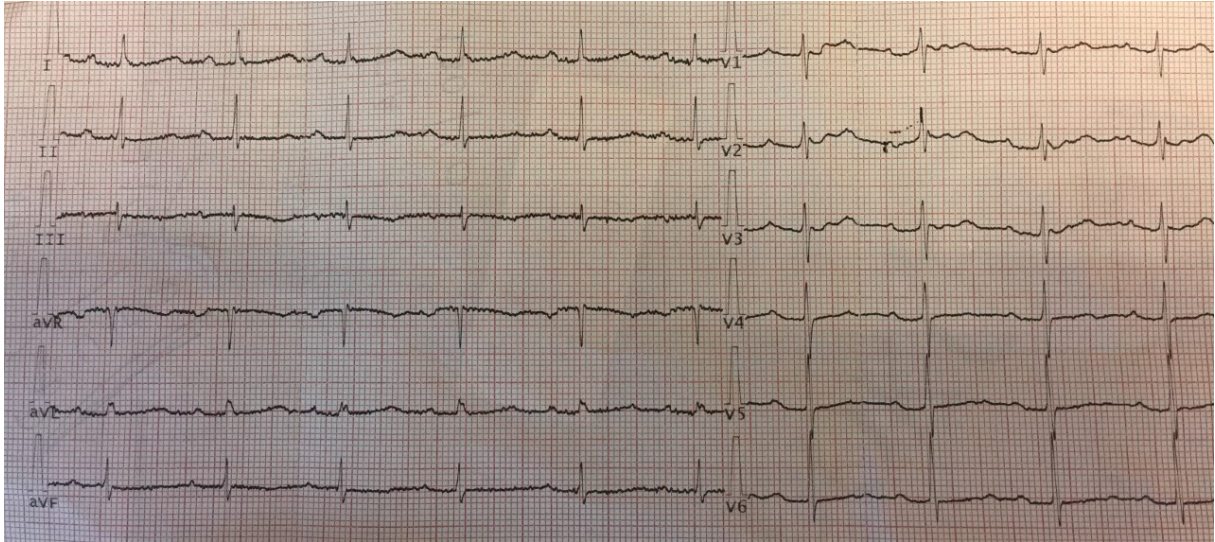


Figure 1. Pre-procedure ECG

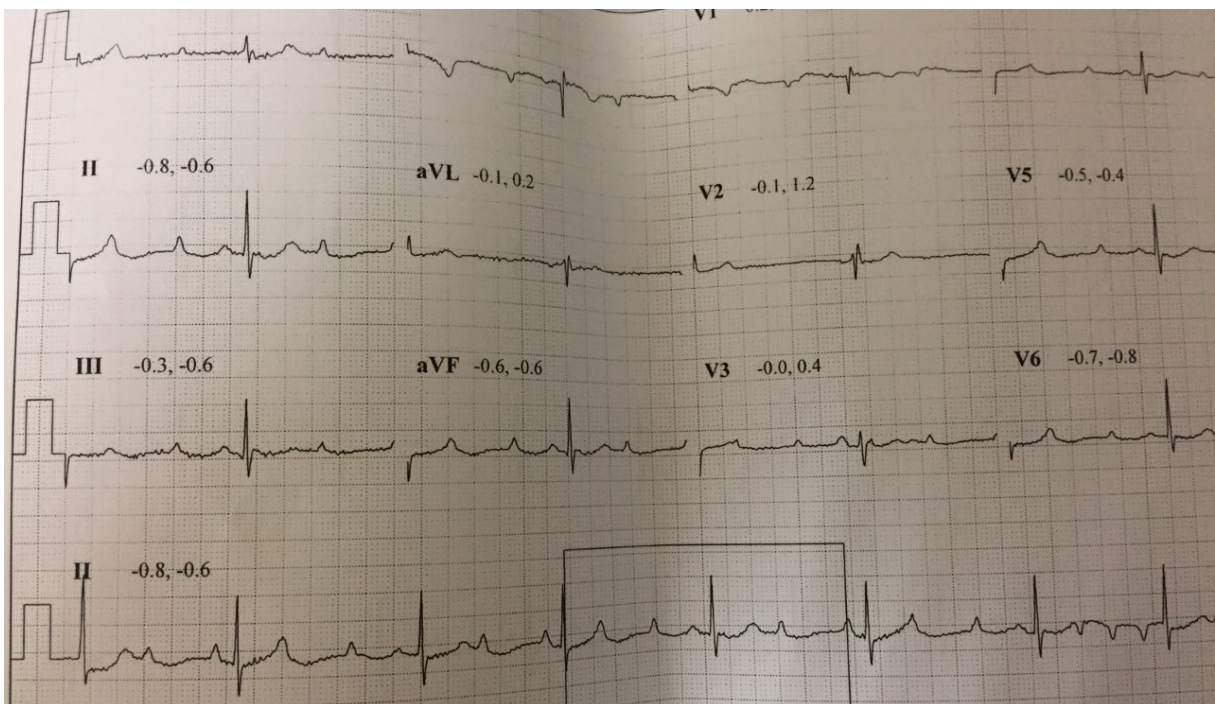


Figure 2. Stage 2-complete AV block



Figure 3. Electrophysiologic study

bundle-right ventricle deflection (HV) interval was 55 ms. During atrial pacing, 1:1 conduction was maintained at rates less than 120 beats/min, but at rates of 120 beats/min or higher, 3:2 or 2:1 AV block occurred. Permanent dual chamber (DDD) pace-maker was implanted to the patient.

DISCUSSION

Exercise-induced AV block is rare. It may present with syncope, dizziness and shortness of breath in patients. Two mechanisms have been proposed for exercise-induced AV block. Firstly, conduction velocity increases through vagolysis and shortness the refractory period in the AV node. But His-Purkinje system is not affected by the autonomic nervous system. Autonomic nervous system does not significantly reduce the refractor period. This difference in resistance between the AV node with His-Purkinje may prone the individuals to transmission disturbances abnormal transmission system (1,3,4). Secondly, it may related to AV nodal ischemia. There is still not a clear opinion in the guidelines about the exercise-induced AV block. Permanent pace-maker implantation in symptomatic patients seems logical, but asymptomatic patients have no clear information. (2,5)

In our case, coronary artery disease was excluded with coronary angiography. EPS findings were supported that nodal AV block. DDD pace-maker implantation was performed because of the patient is symptomatic. The patient's symptoms improved after implantation.

In conclusion, DDD pace-maker implentation is favorable option in patient who had AV block related to exercise and had not coronary ischemia.

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REFERENCES

1. Park M-Y, Shin W-S, Shim B-J, Lee S-J, Park J-H, Koh Y-S, et al. Exercise-Induced Intranodal Atrioventricular Block. *Korean Circulation Journal*. 2012;42(10):698.
2. Woelfel AK, Simpson RJ, Gettes LS, Foster JR. Exercise-induced distal atrioventricular block. *Journal of the American College of Cardiology*. 1983;2(3):578–81.
3. Yuzuki Y, Horie M, Makita T, Watanuki M, Takahashi A, Sasayama S. Exercise-Induced Second-Degree Atrioventricular Block. *Japanese Circulation Journal*. 1997;61(3):268–71.
4. Hong SP. Intra-His bundle block in 2:1 atrioventricular block. *World Journal of Cardiology*. 2015;7(10):700.
5. Hemann BA, Jezior MR, Atwood JE. Exercise-induced Atrioventricular Block. *Journal of Cardiopulmonary Rehabilitation*. 2006;26(5):314–8.